bintec WI-Client

WLAN Ethernet Client Adapter
WLAN Serial Client Adapter

Manual

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Overview

The WI-Client is intended to connect devices with ethernet or serial interfaces to a Wireless Local Area Network (WLAN) corresponding to the 802.11 a/b/g standard. The WI-Client connects over the ethernet interface all devices in its LAN segment with a LAN that is accessible over WLAN.

The WI-Client can receive and transmit data over its serial port which are exchanged over LAN or WLAN with other devices, i.e. annother WI-Client or a computer with a suitable software.

Functional blocks:

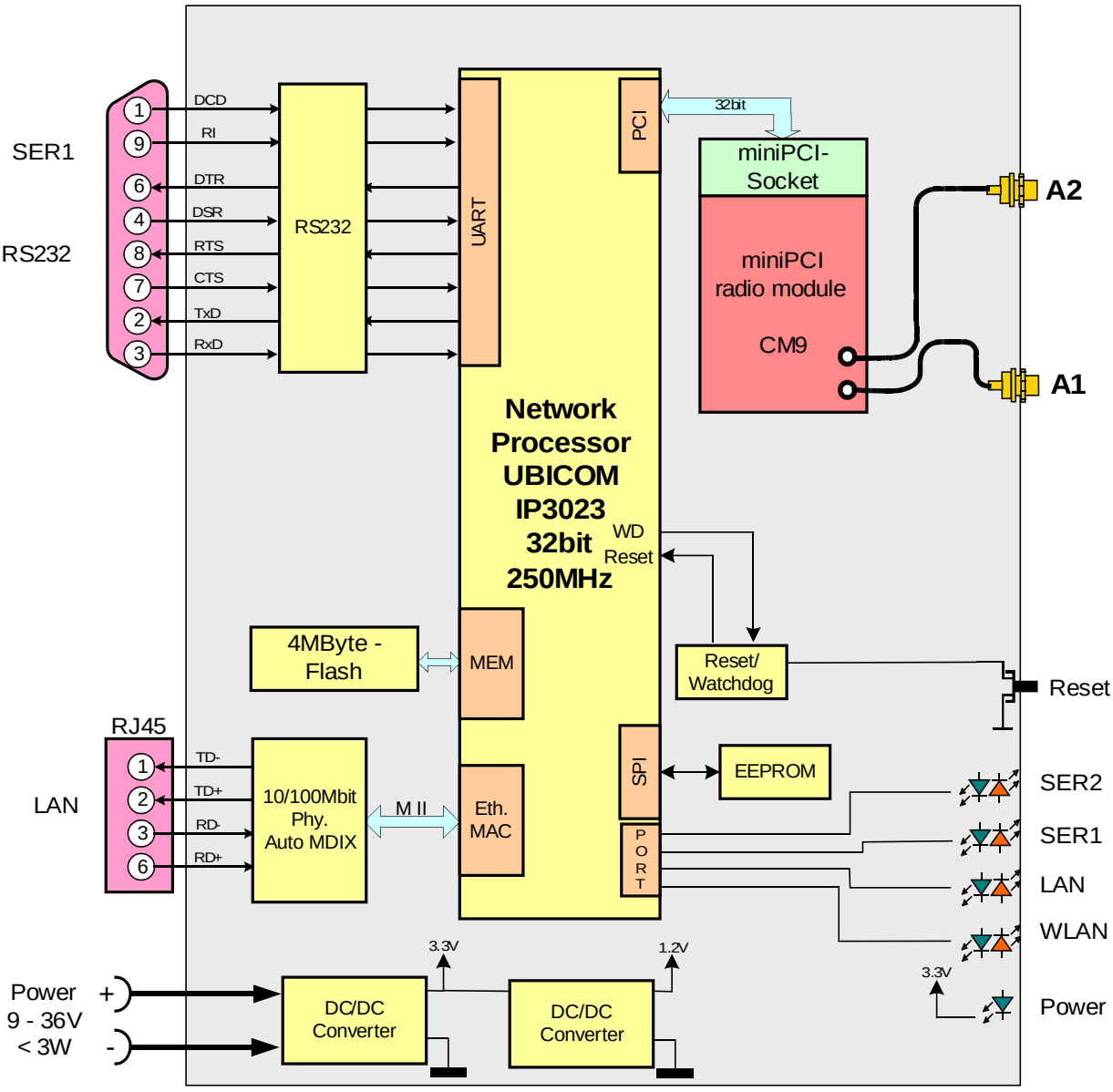


Illustration 1 Block schematic

The core of the WI-Client is a 32bit network processor that controls all functions.

The interfaces:

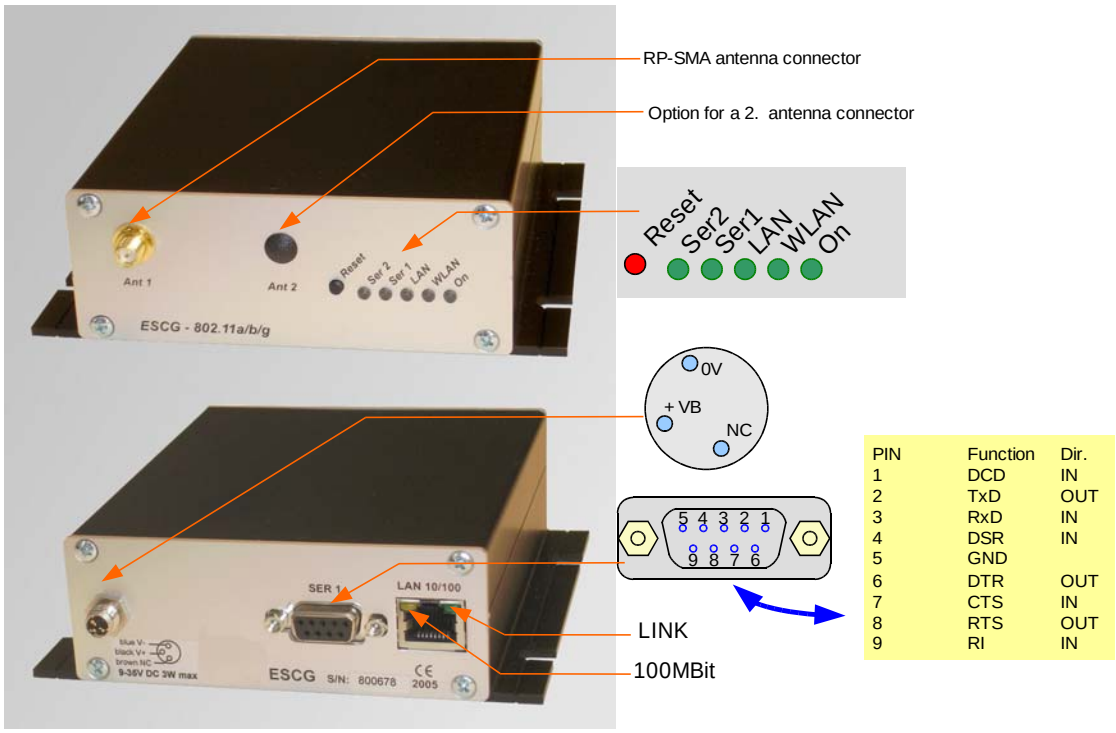
1) Mini-PCI-Socket
2) Ethernet-Interface 10/100 MBit + auto MDI (auto crossover function)
3) 1 or 2 serial interfaces with 6 status lines each

The ethernet port has a RJ45 plug. Because of the auto MDI functionality the WI-Client can be attached to a HUB or the LAN port of a computer with standard patch cables. The WI-Client recognizes the cable polarity and automatically connects the right signal lines.

The serial port is a 9 pin female D-SUB connector. The pinout makes it possible to connect to a computer COM port with a 1 to 1 serial cable, the exact pinout is shown in Illustration above.

The power supply should be 9 – 35VDC / 3W. At 12VDC the input current is typical 250mA.

Back and front view:



PIN	Function	Dir.
1	DCD	IN
2	TxD	OUT
3	RxD	IN
4	DSR	IN
5	GND	
6	DTR	OUT
7	CTS	IN
8	RTS	OUT
9	RI	IN

Illustration 2 Connections and LEDs

LED	Function		
On	**Green**	always on when power is on	
WLAN	**Red blinking** **Steady green** **Green blinking** **Green + red blinking**	searching for RF-connection (scanning) found a suitable Access-Point and established a connection 802.1x Authentification is in process RF activity (receive or transmit)	
LAN	**Off** **Green** **Green + red blinking**	no link is recognized link is established with another LAN device. activity on the LAN interface	
Ser1 (2)	**Off** **Green** **Green + red blinking**	interface is inactive or not connected to the other (W)LAN-.communication side connected to other serial device. activity on the serial interface (receive or transmit)	

Technical features:

Processor	Type	32bit network processor 250MHz clock
	Memory	256KByte program (internal) 64KByte data (internal) 4MByte flash (external) 4MByte SDRAM (external, optional)
Interface	Ethernet	10/100 Mbps fast ethernet auto MDI/MDIX
	Serial 1	RS232 with control lines RTS, CTS, DSR, DTR,DCD (input), RI (input) (optional as RS485, RS422)
	Serial 2	Same as serial 1 but only RS232
	Mini-PCI	Socket for RF cards with Atheros chipsets (AR5112, AR5113)
	Relay (optional)	Relay contact can be operated over LAN or WLAN Connection with circular M8-4pin connector
	AUX input (optional)	Isolated input with optocouple
LEDs	LEDs	- Power (green) - WLAN (green, red) - LAN (green, red) - SER1 (green, red) - SER2 (green, red)
Power supply	Connector	Circular M8-3pin connector with screw locking
	Power consumption	< 2.5W (typ.) < 3W (max.)
	Voltage range	Standard: 8-30V non isolated
Temperature range		operating 0 - 70°C (32 - 158°F) storage -20 - 80°C (-4 - 176°F)
Dimensions	Board	120x100x20mm
	Case	standard: 125x105x40mm
	Weight	approx. 500g

WLAN - Interface:

WLAN	Encryption	64, 128bit WEP, AES
	Security	802.11i WPA + WPA2 (Wifi Protected Access) (PSK/TKIP) 802.1x (EAP-TLS, EAP-PEAP), LEAP
	Data rates	802.11b 11, 5,5, 2 & 1 MBit/Sec. 802.11g 54, 48, 36, 24, 18, 12, 9, 6 MBit/Sec. 802.11a 54, 48, 36, 24, 18, 12, 9, 6 MBit/Sec.
	Frequencies	ISM band: 2.400 MHz to 2.483 MHz U-NII band: 5.150 MHz to 5.350 MHz (ETSI, RegTP indoor) 5.470 MHz to 5.725 MHz (ETSI, RegTP outdoor)
	Channels	802.11b/g: ETSI: 1-13, (3 non overlapping) 802.11a: ETSI: 12 non overlapping (5.150-5.350 & 5.470-5.725 MHz)
	Power output	802.11b/g: 18dBm peak 802.11a: 18 or 17dBm

First Time Setup

To set up the WI-Client it has to be connected with a patch cable to the ethernet interface of a computer. Because of the auto MDI/MDIX capability, you can use a straight or crossover patch cable.
After applying power, the green “Link LED“ on the RJ45 connector shines when a link is detected. The yellow “100 MBit LED“ indicates whether the connection is capable of 100 MBit.
The “LAN” LED on the front panel shines green when a connection has been established over the ethernet.
The “WLAN” LED on the front panel will be blinking red because usually no suitable WLAN is recognized.

The ComPoint Manager

To do the „first time setup“ the WI-Client has to be connected via the LAN-Interface to the computer (PC) that runs the ComPoint Manager Program.

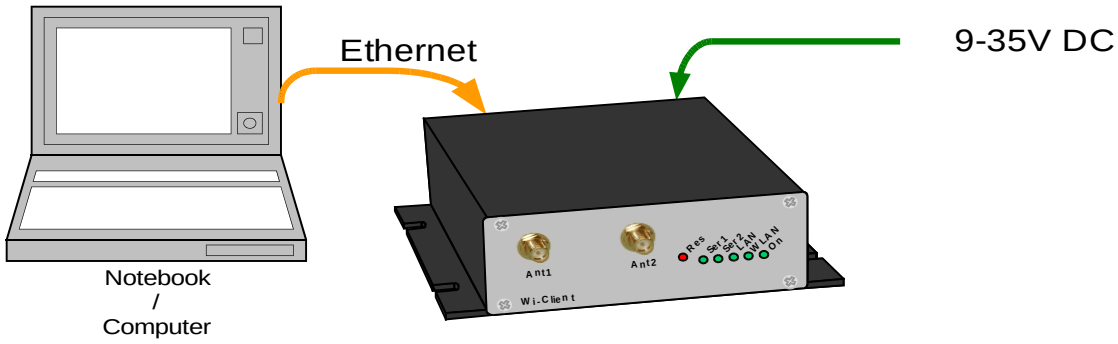


Illustration 3 arrangement to configure the WI-Client

You have to observe:

- The connected PC should have an fixed IP address. (no DHCP)
- The LAN-Interface at the PC must be detected as connected. Check the parameter of the LAN-Interface with the „ipconfig“-command.
- If the LAN-Interface of the PC is correctly recognized then press the „refesh“-button of the WI-Client-config-program.
- An active firewall could prevent the communication the WI-Client.

For detection of the WI-Client and managing of the IP address the CD Rom contain a small tool, this tool is called ComPoint Manager.

After the start the ComPoint Manager ascertained all network interfaces that are active at the PC. After that the ComPoint Manager sends broadcast UDP requests to all these Interfaces. The registered answers of the WI-Client devices are shown in a list.

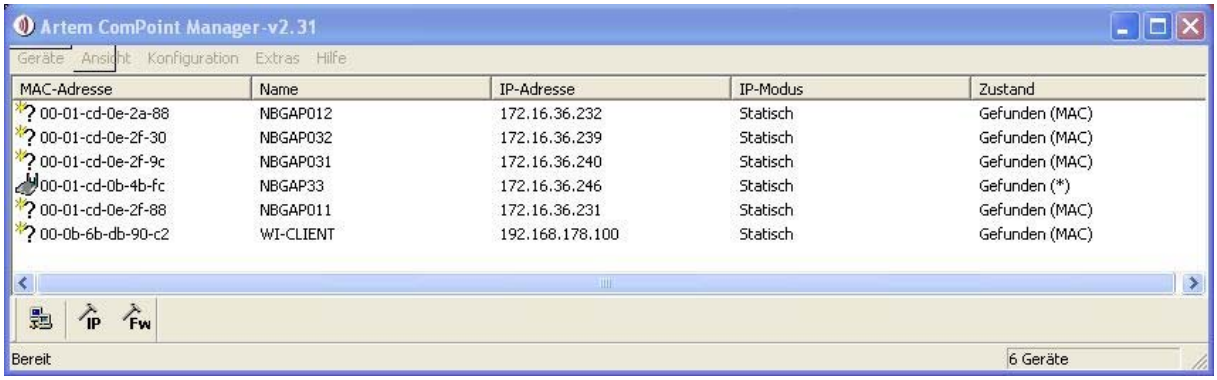

Artem ComPoint Manager-v2.31
Geräte Ansicht Konfiguration Extras Hilfe
MAC-Adresse Name IP-Adresse IP-Modus Zustand
00-01-cd-0e-2a-88 NBGAP012 172.16.36.232 Statisch Gefunden (MAC)
00-01-cd-0e-2f-30 NBGAP032 172.16.36.239 Statisch Gefunden (MAC)
00-01-cd-0e-2f-9c NBGAP031 172.16.36.240 Statisch Gefunden (MAC)
00-01-cd-0b-4b-fc NBGAP33 172.16.36.246 Statisch Gefunden (*)
00-01-cd-0e-2f-88 NBGAP011 172.16.36.231 Statisch Gefunden (MAC)
00-0b-6b-db-90-c2 WI-CLIENT 192.168.178.100 Statisch Gefunden (MAC)
IP
Fw
Bereit
6 Geräte

Illustration 4 screenshot of the ComPoint Manager

All located WI-Client-Devices are shown in list. A click to a device opens a sub window to change the unit name and the IP address.

Reset to factory default

The factory default settings can be restored by pressing the reset button located on the front panel for a longer period. After about 5 seconds the LEDs “SER1“ and “SER2“ starts blinking red and green alternately. By keeping the button depressed the factory default values are restored. After finishing all LEDs except the “ON” LED are turned off. Now the reset button can be released.

main factory default values:

SSID = “WI-Client_WLAN“
WEP = OFF
WPA = OFF
MODE= 802.11b/g

IP = 192.168.0.252
Netmask = 255.255.255.0

SER1+2 : off
802.1x user: „admin“
802.1x password: „password“

Parameter setting via WEB interface

Information page

General information regarding firmware versions and status reports

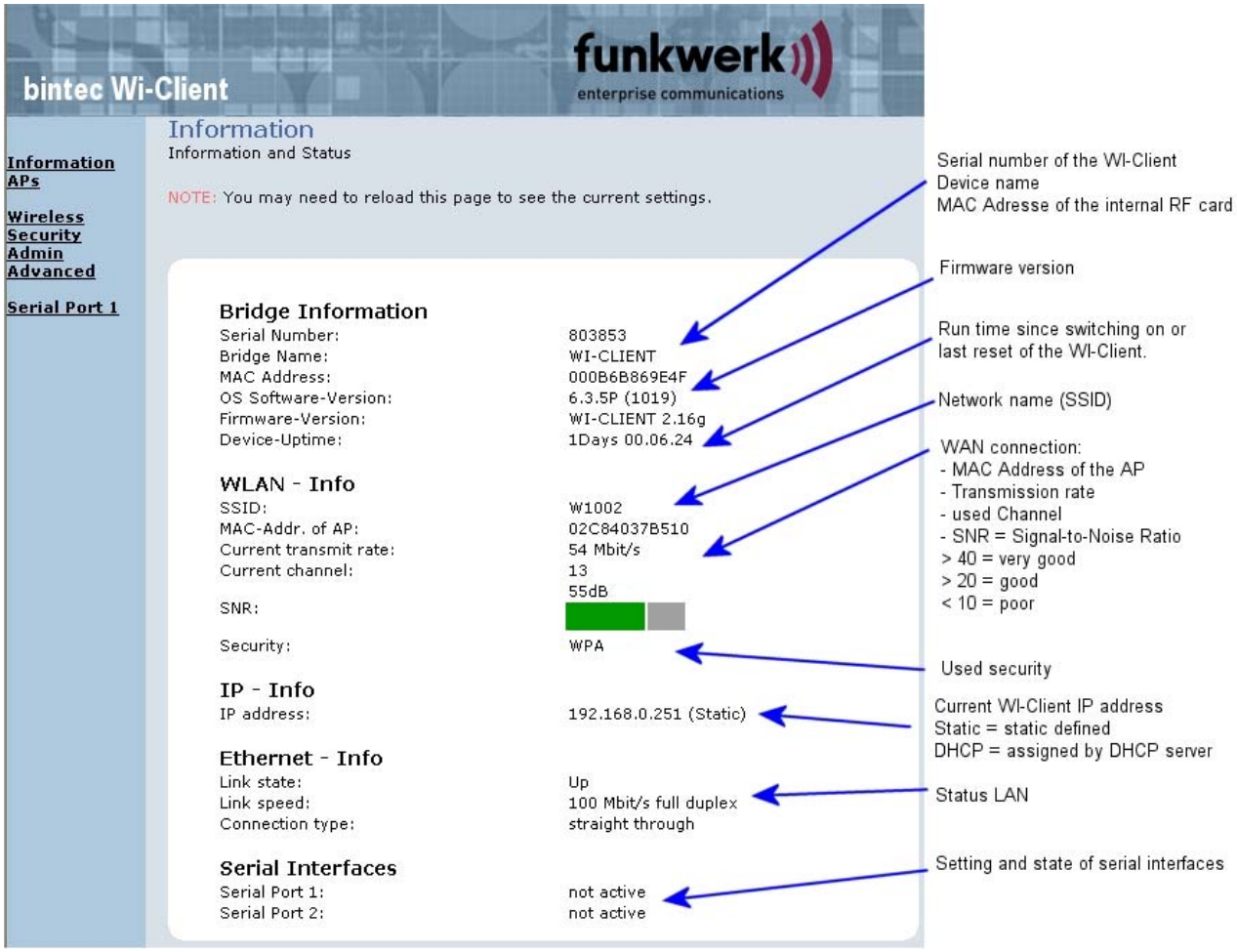


Illustration 5: Information page

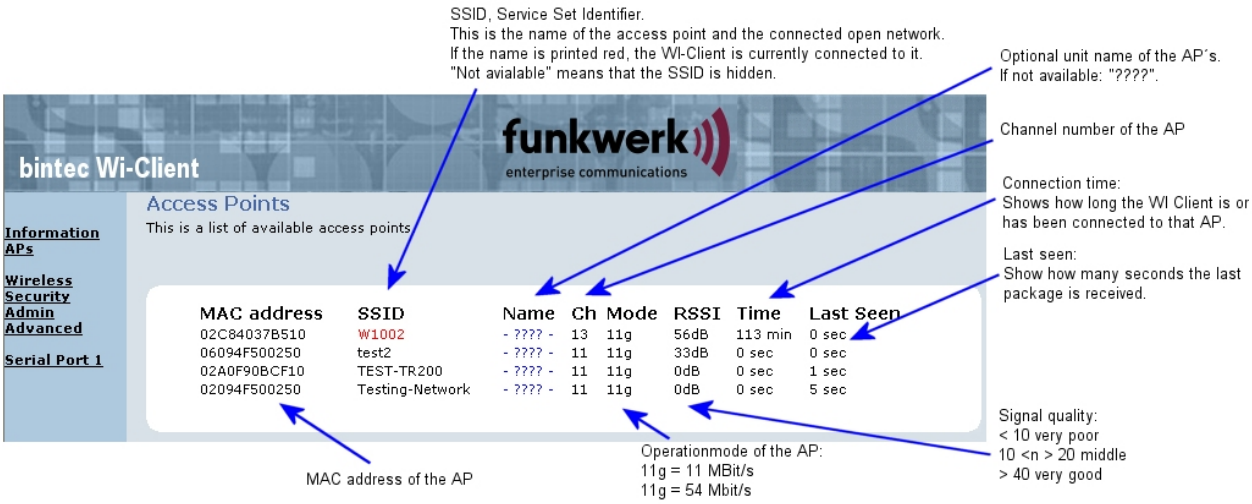
On the left hand side are links to different setup and info pages.

- Information the page above(Illustration)
- APs Shows a table with all access points currently seen by the WI-Client (Illustration).

- Wireless WLAN interface setup (SSID, mode, frequencies etc.) (Illustration)
- Security Encryption setup (WPA, WEP) (Illustration)
- Admin - reboot WI-Client
  - reset all parameters to default.
  - firmware updates
  - configure IP-address, subnet mask, gateway IP
  - configure setup options
  - enter username and password
  (Illustration)
- serial Port 1 setup of serial port 1 ()
- serial Port 2 setup of serial port 2

Access Point page

Information on all access points currently available to the WI-Client.


SSID, Service Set Identifier.
This is the name of the access point and the connected open network.
If the name is printed red, the WI-Client is currently connected to it.
"Not avialable" means that the SSID is hidden.
Optional unit name of the AP´s.
If not available: "????".
Channel number of the AP
Connection time:
Shows how long the WI Client is or has been connected to that AP.
Last seen:
Show how many seconds the last package is received.
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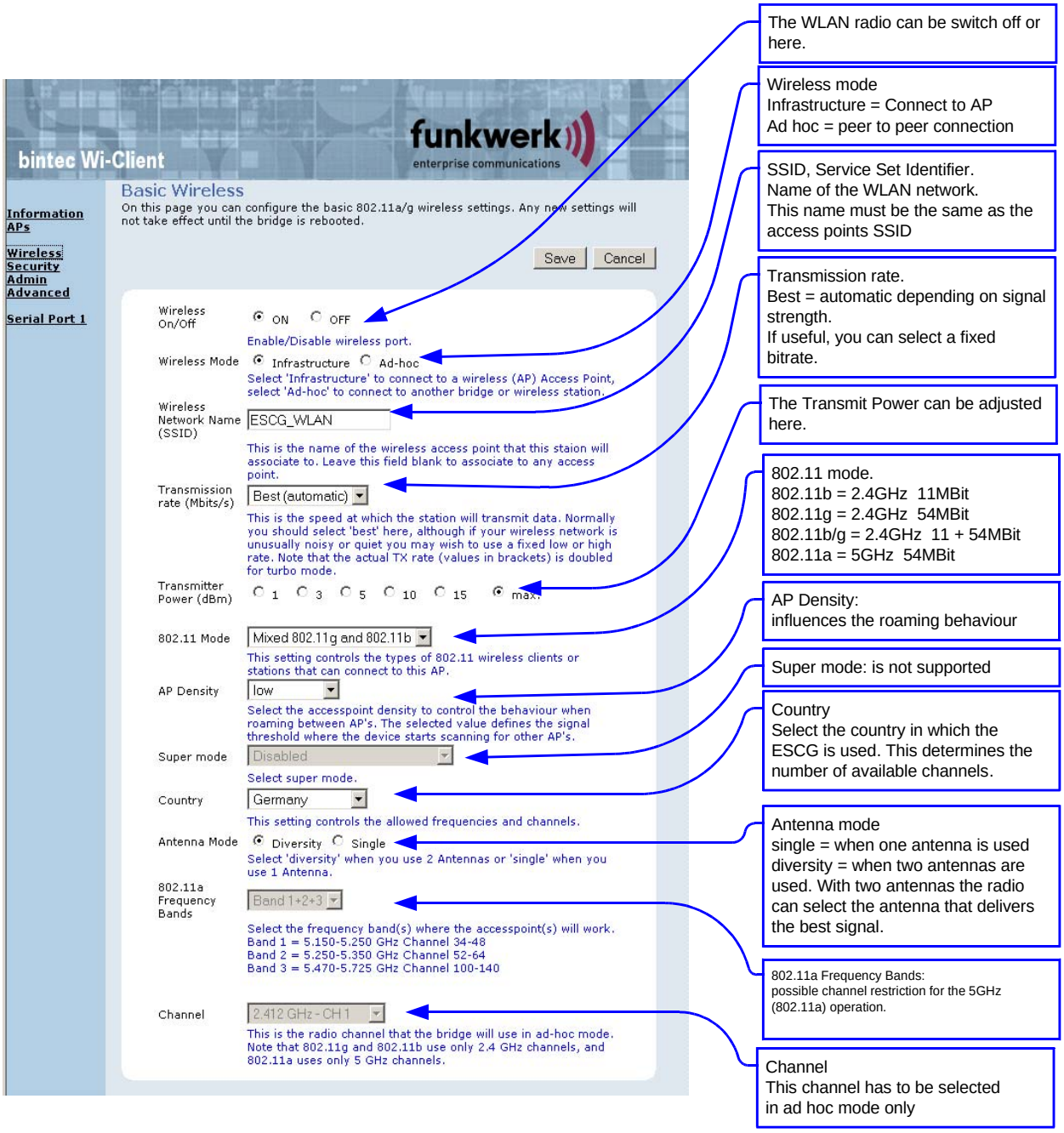
Information
APs
Wireless
Security
Admin
Advanced
Serial Port 1
Access Points
This is a list of available access points
MAC address SSID Name Ch Mode RSSI Time Last Seen
02C84037B510 W1002 - ???? - 13 11g 56dB 113 min 0 sec
06094F500250 test2 - ???? - 11 11g 33dB 0 sec 0 sec
02A0F90BCF10 TEST-TR200 - ???? - 11 11g 0dB 0 sec 1 sec
02094F500250 Testing-Network - ???? - 11 11g 0dB 0 sec 5 sec
MAC address of the AP
Operationmode of the AP:
11g = 11 MBit/s
11g = 54 Mbit/s
Signal quality:
< 10 very poor
10 <n > 20 middle
> 40 very good

Illustration 6: Access Point page

Wireless page

Configuring the WLAN interface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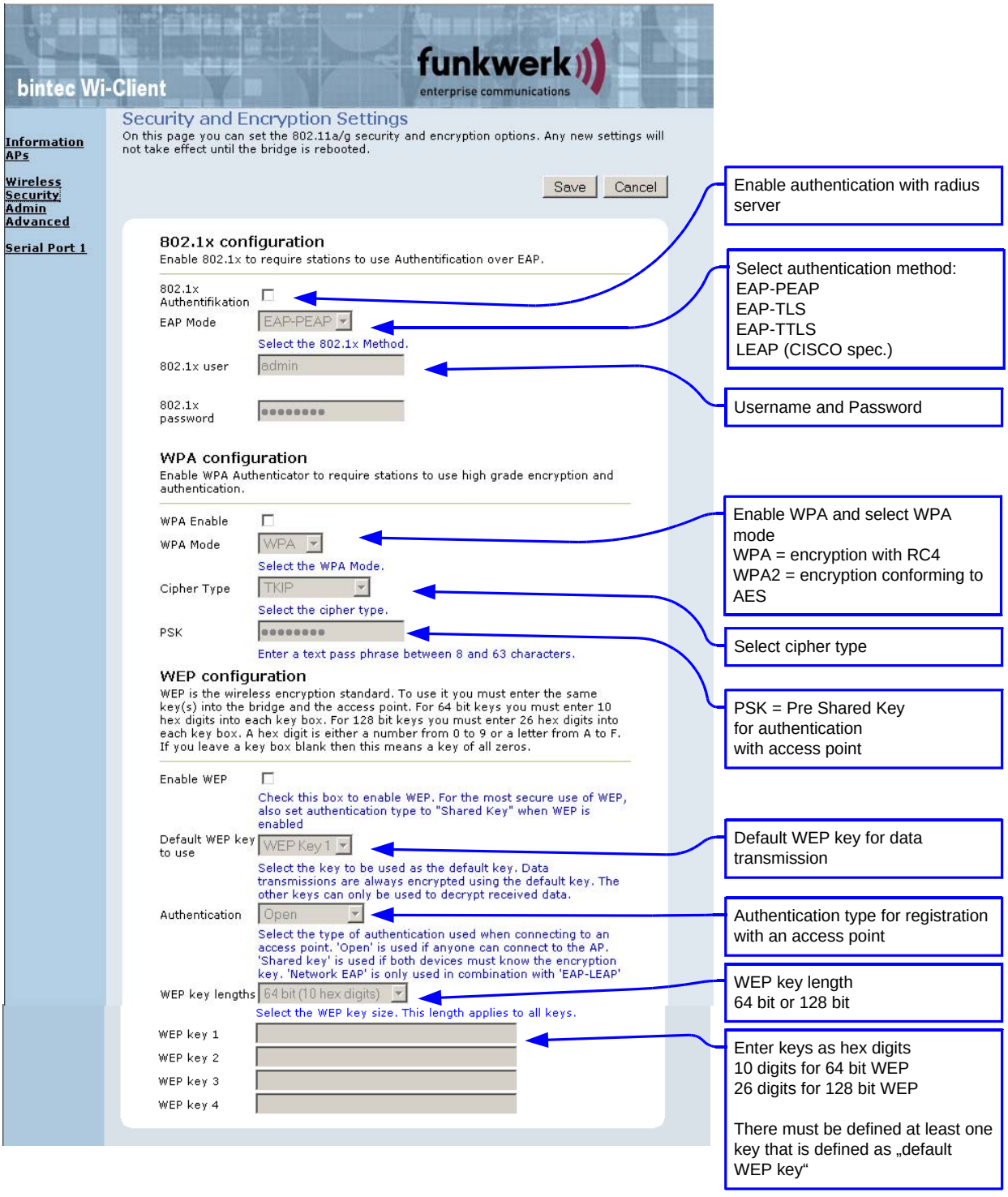
enterprise communications
Information
APs
Wireless
Security
Admin
Advanced
Serial Port 1
Basic Wireless
On this page you can configure the basic 802.11a/g wireless settings. Any new settings will not take effect until the bridge is rebooted.
Save
Cancel
Wireless On/Off
ON
OFF
Enable/Disable wireless port.
Wireless Mode
Infrastructure
Ad-hoc
Select 'Infrastructure' to connect to a wireless (AP) Access Point, select 'Ad-hoc' to connect to another bridge or wireless station.
Wireless Network Name (SSID)
ESCG_WLAN
This is the name of the wireless access point that this staion will associate to. Leave this field blank to associate to any access point.
Transmission rate (Mbits/s)
Best (automatic)
This is the speed at which the station will transmit data. Normally you should select 'best' here, although if your wireless network is unusually noisy or quiet you may wish to use a fixed low or high rate. Note that the actual TX rate (values in brackets) is doubled for turbo mode.
Transmitter Power (dBm)
1
3
5
10
15
max
802.11 Mode
Mixed 802.11g and 802.11b
This setting controls the types of 802.11 wireless clients or stations that can connect to this AP.
AP Density
low
Select the accesspoint density to control the behaviour when roaming between AP's. The selected value defines the signal threshold where the device starts scanning for other AP's.
Super mode
Disabled
Select super mode.
Country
Germany
This setting controls the allowed frequencies and channels.
Antenna Mode
Diversity
Single
Select 'diversity' when you use 2 Antennas or 'single' when you use 1 Antenna.
802.11a Frequency Bands
Band 1+2+3
Select the frequency band(s) where the accesspoint(s) will work.
Band 1 = 5.150-5.250 GHz Channel 34-48
Band 2 = 5.250-5.350 GHz Channel 52-64
Band 3 = 5.470-5.725 GHz Channel 100-140
Channel
2.412 GHz - CH 1
This is the radio channel that the bridge will use in ad-hoc mode. Note that 802.11g and 802.11b use only 2.4 GHz channels, and 802.11a uses only 5 GHz channels.
The WLAN radio can be switch off or here.
Wireless mode
Infrastructure = Connect to AP
Ad hoc = peer to peer connection
SSID, Service Set Identifier.
Name of the WLAN network.
This name must be the same as the access points SSID
Transmission rate.
Best = automatic depending on signal strength.
If useful, you can select a fixed bitrate.
The Transmit Power can be adjusted here.
802.11 mode.
802.11b = 2.4GHz 11MBit
802.11g = 2.4GHz 54MBit
802.11b/g = 2.4GHz 11 + 54MBit
802.11a = 5GHz 54MBit
AP Density:
influences the roaming behaviour
Super mode: is not supported
Country
Select the country in which the ESCG is used. This determines the number of available channels.
Antenna mode
single = when one antenna is used
diversity = when two antennas are used. With two antennas the radio can select the antenna that delivers the best signal.
802.11a Frequency Bands:
possible channel restriction for the 5GHz (802.11a) operation.
Channel
This channel has to be selected in ad hoc mode only

Illustration 7: Wireless page

By clicking the “Save“ button all changes on this page are stored. Use “Cancel” to undo any changes. After clicking “Save” the program prompts the user to make a reboot. This should be done after all necessary changes on all pages have been made.

Security page

Setting up the security options
If the user selects the 802.1x authentication the PSK or the WEP-Keys don't have to be defined because the WI-Client and the Radius-Server will determine these parameters automatically.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Information
APs
Wireless
Security
Admin
Advanced
Serial Port 1
Security and Encryption Settings
On this page you can set the 802.11a/g security and encryption options. Any new settings will not take effect until the bridge is rebooted.
Save
Cancel
802.1x configuration
Enable 802.1x to require stations to use Authentification over EAP.
802.1x Authentifikation
EAP Mode
EAP-PEAP
Select the 802.1x Method.
802.1x user
admin
802.1x password
WPA configuration
Enable WPA Authenticator to require stations to use high grade encryption and authentication.
WPA Enable
WPA Mode
WPA
Select the WPA Mode.
Cipher Type
TKIP
Select the cipher type.
PSK
Enter a text pass phrase between 8 and 63 characters.
WEP configuration
WEP is the wireless encryption standard. To use it you must enter the same key(s) into the bridge and the access point. For 64 bit keys you must enter 10 hex digits into each key box. For 128 bit keys you must enter 26 hex digits into each key box. A hex digit is either a number from 0 to 9 or a letter from A to F. If you leave a key box blank then this means a key of all zeros.
Enable WEP
Check this box to enable WEP. For the most secure use of WEP, also set authentication type to "Shared Key" when WEP is enabled
Default WEP key to use
WEP Key 1
Select the key to be used as the default key. Data transmissions are always encrypted using the default key. The other keys can only be used to decrypt received data.
Authentication
Open
Select the type of authentication used when connecting to an access point. 'Open' is used if anyone can connect to the AP. 'Shared key' is used if both devices must know the encryption key. 'Network EAP' is only used in combination with 'EAP-LEAP'
WEP key lengths
64 bit (10 hex digits)
Select the WEP key size. This length applies to all keys.
WEP key 1
WEP key 2
WEP key 3
WEP key 4
Enable authentication with radius server
Select authentication method:
EAP-PEAP
EAP-TLS
EAP-TTLS
LEAP (CISCO spec.)
Username and Password
Enable WPA and select WPA mode
WPA = encryption with RC4
WPA2 = encryption conforming to AES
Select cipher type
PSK = Pre Shared Key for authentication with access point
Default WEP key for data transmission
Authentication type for registration with an access point
WEP key length
64 bit or 128 bit
Enter keys as hex digits
10 digits for 64 bit WEP
26 digits for 128 bit WEP
There must be defined at least one key that is defined as „default WEP key"

Illustration 8: Security page

Admin page

Setting up administration rights and configure basic features, update firmware

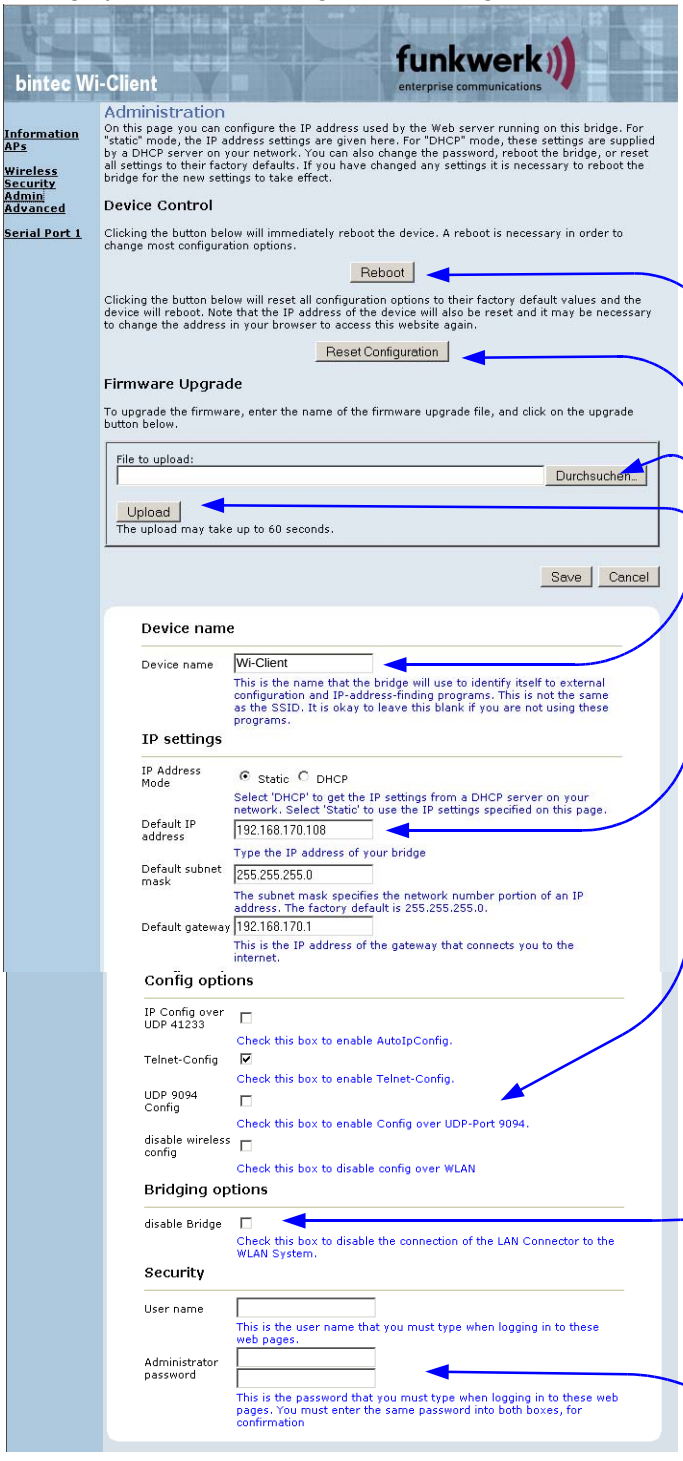
bintec Wi-Client
funkwerk
enterprise communications
Information
APs
Wireless
Security
Admin
Advanced
Serial Port 1
Administration
On this page you can configure the IP address used by the Web server running on this bridge. For "static" mode, the IP address settings are given here. For "DHCP" mode, these settings are supplied by a DHCP server on your network. You can also change the password, reboot the bridge, or reset all settings to their factory defaults. If you have changed any settings it is necessary to reboot the bridge for the new settings to take effect.
Device Control
Clicking the button below will immediately reboot the device. A reboot is necessary in order to change most configuration options.
Reboot
Clicking the button below will reset all configuration options to their factory default values and the device will reboot. Note that the IP address of the device will also be reset and it may be necessary to change the address in your browser to access this website again.
Reset Configuration
Firmware Upgrade
To upgrade the firmware, enter the name of the firmware upgrade file, and click on the upgrade button below.
File to upload:
Durchsuchen...
Upload
The upload may take up to 60 seconds.
Save
Cancel
Device name
Device name
Wi-Client
This is the name that the bridge will use to identify itself to external configuration and IP-address-finding programs. This is not the same as the SSID. It is okay to leave this blank if you are not using these programs.
IP settings
IP Address Mode
Static
DHCP
Select 'DHCP' to get the IP settings from a DHCP server on your network. Select 'Static' to use the IP settings specified on this page.
Default IP address
192.168.170.108
Type the IP address of your bridge
Default subnet mask
255.255.255.0
The subnet mask specifies the network number portion of an IP address. The factory default is 255.255.255.0.
Default gateway
192.168.170.1
This is the IP address of the gateway that connects you to the internet.
Config options
IP Config over UDP 41233
Check this box to enable AutoIpConfig.
Telnet-Config
Check this box to enable Telnet-Config.
UDP 9094 Config
Check this box to enable Config over UDP-Port 9094.
disable wireless config
Check this box to disable config over WLAN
Bridging options
disable Bridge
Check this box to disable the connection of the LAN Connector to the WLAN System.
Security
User name
This is the user name that you must type when logging in to these web pages.
Administrator password
This is the password that you must type when logging in to these web pages. You must enter the same password into both boxes, for confirmation
Reboot the Wi-Client
Restore the Wi-Client configuration to default values
Select firmware file
Upload firmware to Wi-Client
Device name:
This is a name to identify the Wi-Client by external configuration and IP address lookup programs, i.e. the locator program.
This is not the SSID
IP address:
By selecting “DHCP” the Wi-Client is assigned the IP address from a DHCP server on the network.
By selecting “Static” the IP address is fixed. In this case the network mask has to be definded and possibly the default gateway.
Enable more configuration options:
IP Config over UDP 41233: assignment of an IP-Address over the LAN-Interface (special function).
Telnet-Config: Configuration option via an telnet server socket (TCP-Port 23).
disable wireless config: for security reasons it is possible to prevent the configuration via WLAN.
Option to block the bridging funktion of the Wi-Client. This could be useful when the Wi-Client only works as a serial client adapter. The configuration via LAN-Interface is not blocked with this option.
Enter user name and password to protect the
Wi-Client from unauthorized access

Illustration 9: Administration page

Advanced page

The advanced page offers more detailed options to define the behavior of the WI-Client in the WLAN environment.

Cloning

The cloning parameter defines the MAC address of the WI-Client's radio. Usually the WI-Client leaves the MAC address at the manufacturers value. All devices connected to the WLAN over the WI-Client's ethernet port use this MAC address for communication.
The WI-Client keeps a table where the original MAC address of the connected device is linked to its IP address.
If a data package arrives at the WI-Client on the ethernet port, the WI-Client first checks if there is an entry in its table with the source MAC address of this device. If the answer is no, this MAC address is added to the table.
Next it checks if there is an entry for the target MAC address.
If the answer is yes it means that the receiver of this data packet is located on the wired side of the WI-Client and therefore there is no need to send it over the wireless radio.
If the answer is no, the source MAC address is replaced by the radio's MAC address and the data package is sent over the radio to the WLAN
If the WI-Client receives a data package from the WLAN, it first extracts the target IP address. Next it looks up the corresponding MAC address in its table. This MAC address is placed in the data package which is then sent over the ethernet port to the connected devices.
With this method several devices can be connected to the WI-Client.
This procedure only works in LAN's / WLAN's that use the IP protocol. If other protocols are used, the WI-Client can be forced to transfer the MAC address of the first data packet that arrives on the ethernet port to the radio. This method is called cloning. It ensures that all data packages intended for the connected device are received by the WI-Client. The WI-Client can forward the data to the ethernet port without any further processing.
This method allows only one device to be connected to the WI-Client ethernet port. This strategy is activated by selection the option "Eth. Client (var)".

With the option "Eth. Client (fixed)" the user can defined a MAC address that the WI-Client will use for the WLAN Connection.

Advanced bridging

Check this box to disable the data exchange between WI-Client and WLAN. Some WLAN-Systems don't accept that 2 different IP addresses are working with the same MAC-Address. If you check this box, only the IP-Address of the Client that is connected to the LAN-Port will appear on the WLAN side. The configuration of the WI-Client over WLAN is still possible with this setting.

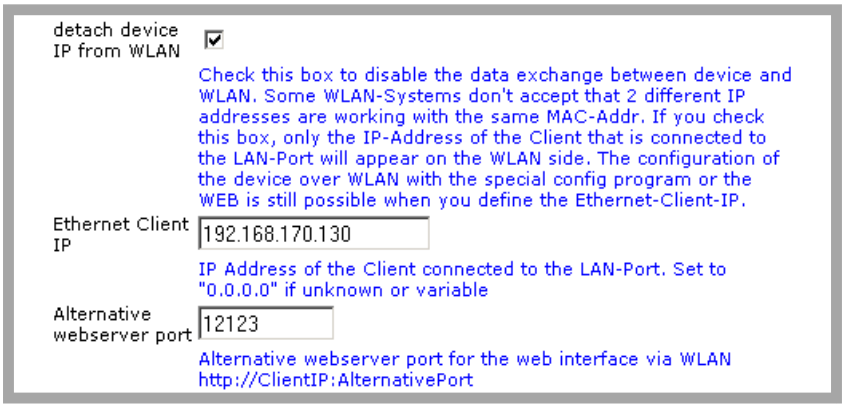
detach device IP from WLAN
Check this box to disable the data exchange between device and WLAN. Some WLAN-Systems don't accept that 2 different IP addresses are working with the same MAC-Addr. If you check this box, only the IP-Address of the Client that is connected to the LAN-Port will appear on the WLAN side. The configuration of the device over WLAN with the special config program or the WEB is still possible when you define the Ethernet-Client-IP.
Ethernet Client IP
192.168.170.130
IP Address of the Client connected to the LAN-Port. Set to "0.0.0.0" if unknown or variable
Alternative webserver port
12123
Alternative webserver port for the web interface via WLAN http://ClientIP:AlternativePort

Illustration 10: Configuration example

Roaming

Roaming is the term for automatically changing to another access point when the WI-Client recognizes a decreasing RF signal level when leaving the covered area of the current access point and a better level with another AP available.
For this purpose the WI-Client keeps a table with a list of access points from which it is receiving signals (beacons).
To receive these beacons the WI-Client has to tune to the different channels and listen for incoming signals for a certain amount of time. This hampers the regular data traffic which the WI-Client has to process. Therefore this procedure is handled in different ways depending on the current signal level.
To make this procedure even more effective, the user can restrict the channels where the WI-Client is allowed to look for beacons of other access points

Ethernet Port

Check this option to enable manual settings for the ethernet port.

DHCP-Relay-Agent

Check this option to enable the DHCP-Relay-Agent of the WI-Client. This is useful if the connected clients at the ethernet port of the WI-Client are using DHCP.

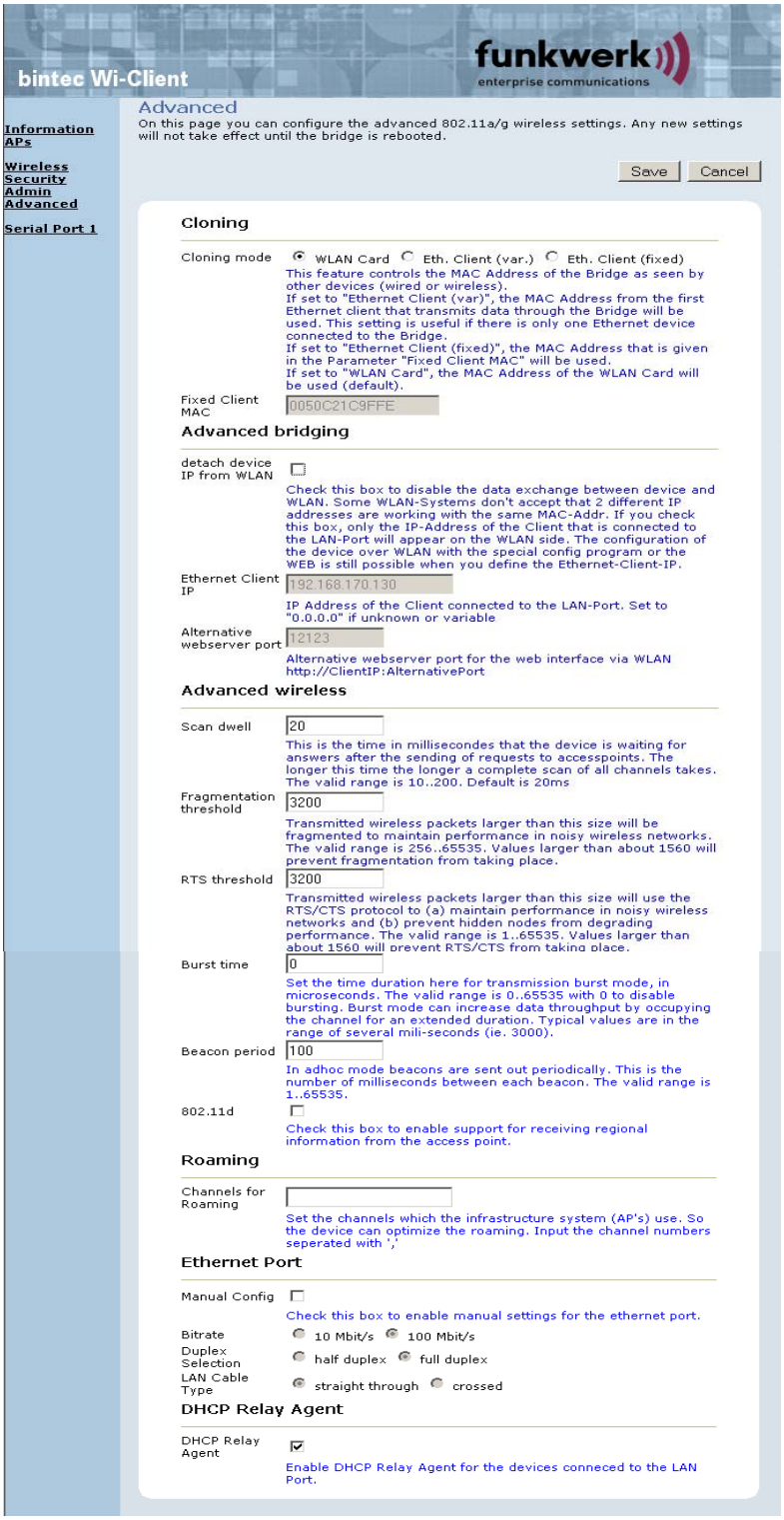
bintec Wi-Client
funkwerk
enterprise communications
Information
APs
Wireless
Security
Admin
Advanced
Serial Port 1
Advanced
On this page you can configure the advanced 802.11a/g wireless settings. Any new settings will not take effect until the bridge is rebooted.
Save
Cancel
Cloning
Cloning mode
WLAN Card
Eth. Client (var.)
Eth. Client (fixed)
This feature controls the MAC Address of the Bridge as seen by other devices (wired or wireless).
If set to "Ethernet Client (var)", the MAC Address from the first Ethernet client that transmits data through the Bridge will be used. This setting is useful if there is only one Ethernet device connected to the Bridge.
If set to "Ethernet Client (fixed)", the MAC Address that is given in the Parameter "Fixed Client MAC" will be used.
If set to "WLAN Card", the MAC Address of the WLAN Card will be used (default).
Fixed Client MAC
0050C21C9FFE
Advanced bridging
detach device IP from WLAN
Check this box to disable the data exchange between device and WLAN. Some WLAN-Systems don't accept that 2 different IP addresses are working with the same MAC-Addr. If you check this box, only the IP-Address of the Client that is connected to the LAN-Port will appear on the WLAN side. The configuration of the device over WLAN with the special config program or the WEB is still possible when you define the Ethernet-Client-IP.
Ethernet Client IP
192.168.170.130
IP Address of the Client connected to the LAN-Port. Set to "0.0.0.0" if unknown or variable
Alternative webserver port
12123
Alternative webserver port for the web interface via WLAN http://ClientIP:AlternativePort
Advanced wireless
Scan dwell
20
This is the time in millisecondes that the device is waiting for answers after the sending of requests to accesspoints. The longer this time the longer a complete scan of all channels takes. The valid range is 10..200. Default is 20ms
Fragmentation threshold
3200
Transmitted wireless packets larger than this size will be fragmented to maintain performance in noisy wireless networks. The valid range is 256..65535. Values larger than about 1560 will prevent fragmentation from taking place.
RTS threshold
3200
Transmitted wireless packets larger than this size will use the RTS/CTS protocol to (a) maintain performance in noisy wireless networks and (b) prevent hidden nodes from degrading performance. The valid range is 1..65535. Values larger than about 1560 will prevent RTS/CTS from taking place.
Burst time
0
Set the time duration here for transmission burst mode, in microseconds. The valid range is 0..65535 with 0 to disable bursting. Burst mode can increase data throughput by occupying the channel for an extended duration. Typical values are in the range of several mili-seconds (ie. 3000).
Beacon period
100
In adhoc mode beacons are sent out periodically. This is the number of milliseconds between each beacon. The valid range is 1..65535.
802.11d
Check this box to enable support for receiving regional information from the access point.
Roaming
Channels for Roaming
Set the channels which the infrastructure system (AP's) use. So the device can optimize the roaming. Input the channel numbers seperated with ','
Ethernet Port
Manual Config
Check this box to enable manual settings for the ethernet port.
Bitrate
10 Mbit/s
100 Mbit/s
Duplex Selection
half duplex
full duplex
LAN Cable Type
straight through
crossed
DHCP Relay Agent
DHCP Relay Agent
Enable DHCP Relay Agent for the devices conneced to the LAN Port.

Illustration 11: Advanced page

Serial interface setup

The WI-Client can have one or two serial interfaces, depending on the options. Each interface is configured on its own WEB page.

Network configuration

There are different modes available for the use of the serial interfaces:

1) **TCP/IP server mode**:
   In this mode the WI-Client opens a socket in a “listen mode”, which means that it is waiting on a certain port (local port) for a connection. The WI-Client only holds one connection at a time. In this mode only the port number has to be specified.
   Remark: This operation mode is compatible with the implementation of the bintec Wix040 and Wix065 Rel.7.8 or higher.
2) **TCP/IP client mode**:
   In this mode the WI-Client actively opens a TCP connection on the specified port of another network node. This node can be another WI-Client or a computer which is waiting for a connection on the specified port. In this mode the port number and the IP address of the connected device have to be specified.
   Remark: This operation mode is compatible with the implementation of the bintec Wix040 and Wix065 Rel.7.8 or higher.
3) **UDP/IP mode**:
   In this mode the WI-Client is waiting for data on the “local port“ which are sent with UDP/IP. The received data are then sent to the “remote port” of the remote IP address. The UDP should be used in circumstances where the communication between the devices is frequently interrupted. It should be considered though that the UDP protocol does not guarantee the correct transfer of data.
4) **Printer server mode**:
   In this mode the WI-Client starts a TCP/IP socket in server mode which is waiting for a connection on port 515. The WI-Client is then able to execute print jobs corresponding to RFC1179. If you want to enable a printer with this method under Windows, it has to be set up like the following example:

   Example:
   Windows setup for a printer connected via LPR

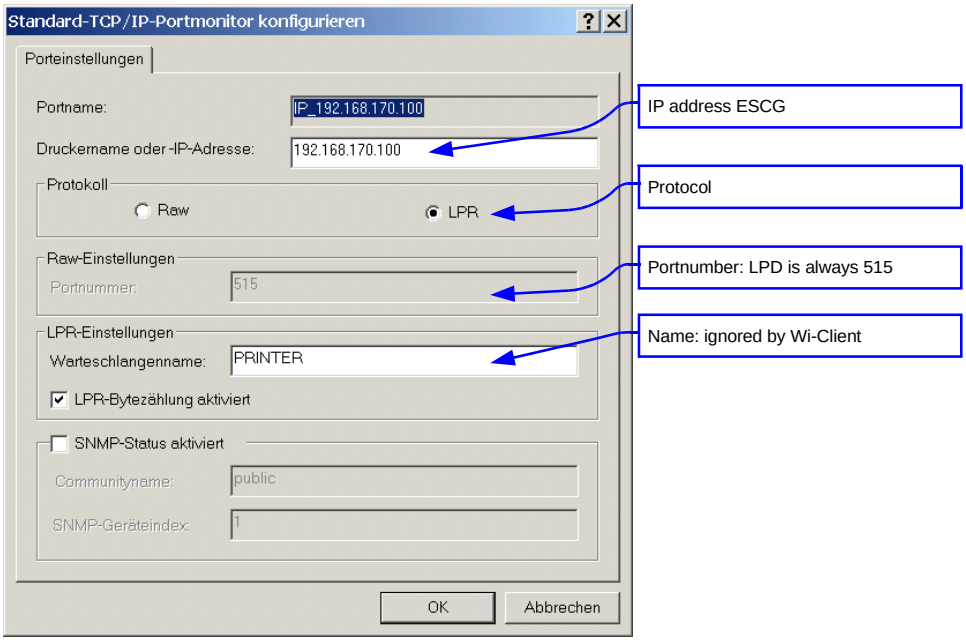

Illustration 12: Windows TCP/IP Portmonitor

5) **COM server mode**:
   In this mode the WI-Client provides virtual COM ports under Windows. For this purpose a software tool from the company Wiesemann & Theis (www.wut.de) has to be installed. The tool is named “COM

Umlenkung. This tool enables the WI-Client to connect to serial devices over LAN/WLAN. After installation of the software enter the WI-Client IP address and port number.
Please read and following the license terms of the tool.

Comment to the multicast settings

In the Multicast-Mode serial busmembers who are communicating with RS485 interfaces can be connected via the (W)LAN. Depending which task the serial device takes it is possible to configure different modes:

1. Slave
2. Master
3. Multimaster

As a slave the WI-Client receives data on the configured multicast address and sends this data to the serial interface. Data that is received from the serial line is sent to the given unicast IP address.

As a master the WI-Client receives data from the unicast IP address and transmits data to the multicast IP address.
In multimaster mode all transfers are done via the multicast IP address.

sample application:

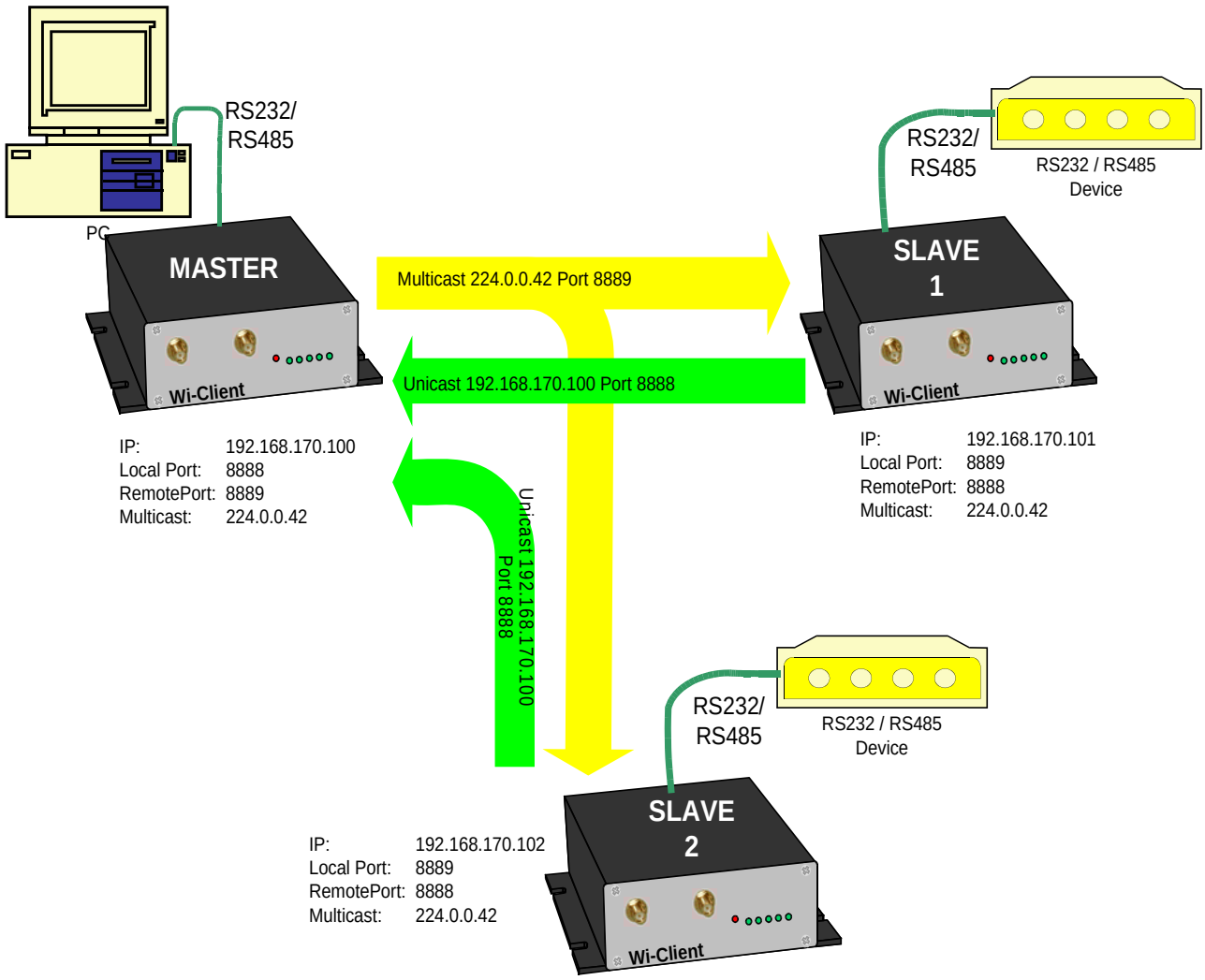

Illustration 13: Multicast-mode

“Keep alive“ settings

A TCP/IP connection remains open after being established until one of the communicating devices closes the connection. If the physical connection between the WI-Client and the other device is interrupted without closing the TCP/IP connection, there is a possibility that the WI-Client is not able to reconnect. The TCP/IP socket can be programmed to send an empty data package to the communication partner in regular intervals (keep alive period). If the communication partner supports this mode, it sends a corresponding answer. This answer is proof that the connection is still intact. If there is no answer for a number of times (keep alive probes), the TCP/IP connection is closed and the WI-Client starts the TCP/IP socket again.

“Send trigger” configuration

The data received by the WI-Client are first temporarily stored. There are different criteria when the stored data will be sent over the LAN/WLAN.

1) **Byte trigger**: The user defines a number of Bytes. After reaching that number, the stored data are sent.
2) **Timeout**: After receiving a character a timer with the programmed value is started. Each received character restarts the timer. Once the timer has elapsed the stored data are sent.
3) **Delimiter**: The user defines a certain character. When this character is received, the stored data are sent.

The parameter “**receive fifo size”** defines the quantity of bytes that can be stored in a ringbuffer before the data is sent to the (W)LAN interface. If you use the WI-Client in an application that receives permanently data via the serial interface the “receive fifo size” has to be set to a value between 1024 and 2048 bytes. Because the WI-Client needs all the available RAM memory in a situation of authentication with 802.1x (PEAP,TLS) this value is set to a value of 256 Bytes by default to save memory space.

Handshake mode

This defines how the communication partners are signaling their ability to send and receive data. With the status lines RTS and DTR the WI-Client reports that it is ready to receive. The status lines CTS and DTR are inputs where the communication partner reports its readiness to receive. The signals DCD and RI can be forwarded to the WI-Clients LAN/WLAN communication partner.
The WI-Client be controlled remote or local to handle the data flow.
The following modes are available to the user:

1) **no handshake**: The CTS/DSR signals are not utilized. CTS/RTS are set to active when the serial interface is connected over the LAN/WLAN.
2) **XON / XOFF** : The WI-Client sends and receives the control characters XON = 0x11 and XOFF = 0x13. The WI-Client sends a XOFF to his serial communication partner when the memory buffer is almost full and a XON when it is almost empty.
3) **RTS/CTS**: The WI-Client signals that it is ready to receive over the RTS line and recognizes the CTS signal to determine if its serial partner is ready to receive.
4) **DTR/DSR**: The WI-Client signals that it is ready to receive over the DTR line and recognizes the DSR signal to determine if its serial partner is ready to receive.
5) **Remote**: In this mode the WI-Client transmits the state of the status lines CTS, DSR, RI and DCD to its LAN/WLAN communication partner. This happens over a different socket (port). This makes it necessary for the user to enter more specifications.
   The state of the status lines are described by strings of letters.
   A capital letter means the signal is active, a small letter means inactive.
   ’D’ = DSR active ‘d’ = DSR inactive
   ’R’ = CTS active ‘r’ = CTS inactive
   ’C’ = DCD active ‘c’ = DCD inactive
   ’I’ = DSR active ‘i’ = DSR inactive

   The WI-Client interprets the received data as follows:
   ’D’ -> set DTR to active ‘d’ = set DTR to inactive
   ’R’ -> set RTS to active ‘r’ = set RTS to inactive
   ‘C’ or ‘c’ and ‘I’ or ‘i’ are ignored.

6) **3964R**: This is a special protocol which is commonly used for communication with SPS (programmable control systems). This protocol uses special characters and events to signal when it is ready to transmit and receive. Descriptions of this protocol are available in literature.

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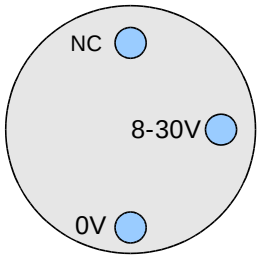
enterprise communications
Information
APs
Wireless
Security
Admin
Advanced
Serial Port 1
Serial Client on Port 1
On this page you can configure the serial client on port 1. Any new settings will not take effect until the bridge is rebooted.
Save
Cancel
Port active
Check this box to enable this serial port.
Port 1 baudrate and format
Baudrate
9600
Baudrate for this serial Port
Paritybit
none
Select the parity bit.
Databits
8
Select the number of databits
Stopbits
1
Select the number of stopbits.
Port 1 network configuration
Port mode
TCP/IP server
Select the port mode.
Server IP
192.168.170.242
Server IP in client mode
Local port
8888
Local port number
Remote port
9999
Remote port number
Port 1 multicast configuration
Multicast mode
no multicast
no multicast = send + receive unicast
Slave = receive multicast, send unicast
Master = receive unicast, send multicast
Multimaster = receive multicast, send multicast
Multicast IP address
224.0.1.42
Port 1 keep alive parameter
keep alive period
0
Time between two "TCP keep alives" in seconds.
keep alive probes
0
Amount of "keep alive probes" - failure till the TCP connection is closed.
Port 1 send trigger configuration
Byte trigger
128
Number of bytes in the receive buffer to trigger the network sendroutine.
Character timeout
10
Timeout in milliseconds between 2 characters to trigger the sendroutine.
Frame end delimiter
This is a single HEX value. When the delimiter byte is received the receivebuffer will be send.
Receive FIFO size
256
Receive FIFO size in bytes. The receive FIFO stores the bytes before they are send to the network (WLAN or LAN) interface. Because of the limited memory space of this device you should take the lowest possible value.
Port 1 handshake mode
XON/XOFF, RTS/CTS or DTR/DSR are local handshake modes. In 'transparent mode' the status of the handshake input signals (DSR+CTS) will be send to the remote side via an extra port. 3964R means that the serial port handles this protocol for sending and receiving data
Handshake protocol
no Handshake
Select the method of doing the handshake.
Local port
9880
Local port number for handshake.
Remote port
9880
Remote port number for handshake.

Illustration 14: Serial interface setup

Power supply connector

The WI-Client is equipped with a circular M8- 3pin connector. The connection is as follows:



M8 cable wire colors:

0V	blue
8-30V	black
NC	brown

NC = not connected

Illustration 15: Power supply connector

Legal Notice

Aim and purpose
This document is part of the user manual for the installation and configuration of funkwerk devices. For the latest information and notes on the current software release, please also read our release notes, particularly if you are updating your software to a higher release version. You will find the latest release notes under www.funkwerk-ec.com .

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How to reach Funkwerk Enterprise Communications GmbH
Funkwerk Enterprise Communications GmbH, Südwestpark 94, D-90449 Nuremberg, Germany, Phone: +49 180 300 9191 0, Fax: +49 180 300 9193 0

Funkwerk Enterprise Communications France S.A.S., 6/8 Avenue de la Grande Lande, F-33174 Gradignan, France, Phone: +33 5 57 35 63 00, Fax: +33 5 56 89 14 05

Internet: www.funkwerk-ec.com